

Patent Claims

1. A filter material consisting of an at least two-ply structure, wherein at least one ply contains natural fibres and one ply biodegradable, thermoplastic fibres, wherein the thermoplastic fibres are selected from the group comprising aliphatic or partially aromatic polyesteramides, aliphatic or partially aromatic polyesters, aliphatic or partially aromatic polyesterurethanes, aliphatic or aliphatic-aromatic polyestercarbonates.
2. A filter material according to claim 1, wherein the thermoplastic fibres are selected from among the following polymers:
- aliphatic or partially aromatic polyesters prepared from
- A) aliphatic bifunctional alcohols, preferably linear C_2 to C_{10} dialcohols, such as for example ethanediol, butanediol, hexanediol or particularly preferably butanediol and/or optionally cycloaliphatic bifunctional alcohols, preferably having 5 or 6 C atoms in the cycloaliphatic ring, such as for example cyclohexanedimethanol, and/or, partially or entirely instead of the diols, monomeric or oligomeric polyols based on ethylene glycol, propylene glycol, tetrahydrofuran or copolymers thereof having molecular weights of up to 4000, preferably of up to 1000, and/or optionally small quantities of branched bifunctional alcohols, preferably C_3 - C_{12} alkyldiols, such as for example neopentyl glycol, and additionally optionally small quantities of more highly functional alcohols, such as for example 1,2,3-propanetriol or trimethylolpropane and from aliphatic bifunctional acids, preferably C_2 - C_{12} alkyldicarboxylic acids, such as for example and preferably succinic acid, adipic acid and/or optionally aromatic bifunctional acids, such as for example terephthalic acid, isophthalic acid, naphthalenedicarboxylic acid and additionally optionally small quantities of more highly functional acids, such as for example trimellitic acid or

B) from acid- and alcohol-functionalised units, preferably having 2 to 12 C atoms in the alkyl chain, for example hydroxybutyric acid, hydroxyvaleric acid, lactic acid or the derivatives thereof, for example ϵ -caprolactone or dilactide,

or a mixture and/or a copolymer prepared from A and B,

wherein the aromatic acids constitute a fraction of no more than 50 wt.%, relative to all the acids;

aliphatic or partially aromatic polyesterurethanes prepared from

C) aliphatic bifunctional alcohols, preferably linear C_2 to C_{10} dialcohols, such as for example ethanediol, butanediol, hexanediol, particularly preferably butanediol and/or optionally cycloaliphatic bifunctional alcohols, preferably having a C_5 or C_6 cycloaliphatic ring, such as for example cyclohexanedimethanol, and/or, partially or entirely instead of the diols, monomeric or oligomeric polyols based on ethylene glycol, propylene glycol, tetrahydrofuran or copolymers thereof having molecular weights of up to 4000, preferably of up to 1000, and/or optionally small quantities of branched bifunctional alcohols, preferably C_3 - C_{12} alkyl diols, such as for example neopentyl glycol, and additionally optionally small quantities of more highly functional alcohols, preferably C_3 - C_{12} alkyl polyols, such as for example 1,2,3-propanetriol or trimethylolpropane and from aliphatic bifunctional acids, preferably C_2 - C_{12} alkyl dicarboxylic acids, such as for example and preferably, succinic acid, adipic acid, and/or optionally aromatic bifunctional acids, such as for example terephthalic acid, isophthalic acid, naphthalenedicarboxylic acid and additionally optionally small quantities of more highly functional acids, such as for example trimellitic acid, or

D) from acid- and alcohol-functionalised units, for example having 2 to 12 C atoms, for example hydroxybutyric acid, hydroxyvaleric acid, lactic acid or the derivatives thereof, for example ϵ -caprolactone or dilactide,

5 or a mixture and/or a copolymer prepared from C and D,

wherein the aromatic acids constitute a fraction of no more than 50 wt.%, relative to all the acids;

10 E) from the reaction product of C and/or D with aliphatic and/or cycloaliphatic bifunctional and additionally optionally more highly functional isocyanates, preferably having 1 to 12 C atoms or 5 to 8 C atoms in the case of cycloaliphatic isocyanates, for example tetramethylene diisocyanate, hexamethylene diisocyanate, isophorone diisocyanate,
15 optionally additionally with linear and/or branched and/or cycloaliphatic bifunctional and/or more highly functional alcohols, preferably C₃-C₁₂ alkyldiols or alkylpolyols or 5 to 8 C atoms in the case of cycloaliphatic alcohols, for example ethanediol, hexanediol, butanediol, cyclohexanedimethanol, and/or optionally additionally with
20 linear and/or branched and/or cycloaliphatic bifunctional and/or more highly functional amines and/or aminoalcohols preferably having 2 to 12 C atoms in the alkyl chain, for example ethylenediamine or aminoethanol, and/or optionally further modified amines or alcohols, such as for example ethylenediaminoethanesulphonic acid, as the free acid or
25 as a salt,

wherein the ester fraction C) and/or D) amounts to at least 75 wt.%, relative to the sum of C), D) and E),

30 aliphatic or aliphatic-aromatic polyestercarbonates prepared from

- 5 F) aliphatic bifunctional alcohols, preferably linear C_2 to C_{10} dialcohols, such as for example ethanediol, butanediol, hexanediol or particularly preferably butanediol and/or optionally cycloaliphatic bifunctional alcohols, preferably having 5 to 8 C atoms in the cycloaliphatic ring, such as for example cyclohexanedimethanol, and/or, partially or entirely instead of the diols, monomeric or oligomeric polyols based on ethylene glycol, propylene glycol, tetrahydrofuran or copolymers thereof having molecular weights of up to 4000, preferably of up to 1000, and/or optionally small quantities of branched bifunctional alcohols, preferably with C_2 - C_{12} alkyldicarboxylic acids, such as for example neopentyl glycol, and additionally optionally small quantities of more highly functional alcohols, such as for example 1,2,3-propanetriol or trimethylolpropane and from aliphatic bifunctional acids, such as for example and preferably, succinic acid, adipic acid, and/or optionally aromatic bifunctional acids, such as for example 15 terephthalic acid, isophthalic acid, naphthalenedicarboxylic acid and additionally optionally small quantities of more highly functional acids, such as for example trimellitic acid, or
- 20 G) from acid- and alcohol-functionalised units, for example having 2 to 12 C atoms in the alkyl chain, for example hydroxybutyric acid, hydroxyvaleric acid, lactic acid or the derivatives thereof, for example ϵ -caprolactone or dilactide,
- 25 or a mixture and/or a copolymer prepared from F and G, wherein the aromatic acids constitute a fraction of no more than 50 wt.%, relative to all the acids,
- 30 H) a carbonate fraction which is produced from aromatic bifunctional phenols, preferably bisphenol A, and carbonate donors, for example phosgene,
- or

a carbonate fraction which is produced from aliphatic carbonic acid esters or the derivatives thereof, such as for example chlorocarbonic acid esters or aliphatic carboxylic acids or the derivatives thereof, such as for example salts and carbonate donors, for example phosgene, wherein

the ester fraction F) and/or G) amounts to at least 70 wt.%, relative to the sum of F), G) and H);

aliphatic or partially aromatic polyesteramides prepared from

I) aliphatic bifunctional alcohols, preferably linear C_2 to C_{10} dialcohols, such as for example ethanediol, butanediol, hexanediol, particularly preferably butanediol and/or optionally cycloaliphatic bifunctional alcohols, preferably having 5 to 8 C atoms, such as for example cyclohexanedimethanol, and/or, partially or entirely instead of the diols, monomeric or oligomeric polyols based on ethylene glycol, propylene glycol, tetrahydrofuran or copolymers thereof having molecular weights of up to 4000, preferably of up to 1000, and/or optionally small quantities of branched bifunctional alcohols, preferably C_3 - C_{12} alkyl diols, such as for example neopentyl glycol, and additionally optionally small quantities of more highly functional alcohols, preferably C_3 - C_{12} alkylpolyols, such as for example 1,2,3-propanetriol, trimethylolpropane and from aliphatic bifunctional acids, preferably having 2 to 12 C atoms in the alkyl chain, such as for example and preferably succinic acid, adipic acid and/or optionally aromatic bifunctional acids, such as for example terephthalic acid, isophthalic acid, naphthalenedicarboxylic acid and additionally optionally small quantities of more highly functional acids, such as for example trimellitic acid or

K) from acid- and alcohol-functionalised units, preferably having 2 to 12 C atoms in the carbon chain, for example hydroxybutyric acid, hy-

droxyvaleric acid, lactic acid or the derivatives thereof, for example ϵ -caprolactone or dilactide,

or a mixture and/or a copolymer prepared from I) and K),

wherein the aromatic acids constitute a fraction of no more than 50 wt.%, relative to all the acids,

L) an amide fraction prepared from aliphatic and/or cycloaliphatic bifunctional and/or optionally small quantities of branched bifunctional amines, with linear aliphatic C_2 to C_{10} diamines being preferred, and additionally optionally small quantities of more highly functional amines, the amines preferably being hexamethylenediamine, isophoronediamine and particularly preferably hexamethylenediamine, and from linear and/or cycloaliphatic bifunctional acids, preferably having 2 to 12 C atoms in the alkyl chain or a C_5 or C_6 ring in the case of cycloaliphatic acids, preferably adipic acid, and/or optionally small quantities of branched bifunctional and/or optionally aromatic bifunctional acids, such as for example terephthalic acid, isophthalic acid, naphthalenedicarboxylic acid and additionally optionally small quantities of more highly functional acids, preferably having 2 to 10 C atoms, or

M) from an amide fraction prepared from acid- and amine-functionalised units, preferably having 4 to 20 C atoms in the cycloaliphatic chain, preferably ω -lauro lactam, ϵ -caprolactam, particularly preferably ϵ -caprolactam,

or a mixture prepared from L) and M) as the amide fraction, wherein

the ester fraction I) and/or K) amounts to at least 30 wt.%, relative to the sum of I), K), L) and M).

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3. A filter material according to claims 1 and 2, wherein the first ply is a mixture of coniferous wood, deciduous wood, manilla, hemp, jute, sisal and similar natural fibres.
4. A filter material according to claims 1 to 3, wherein the first ply has a basis weight of between 8 and 40 g/m² and an air permeability of 300 to 4000 l/m²·sec (DIN 53 887).
- 10 5. A filter material according to claims 1 to 4, wherein the second ply, consisting of the biodegradable thermoplastic fibres, has a basis weight of 1 to 15 g/m².
6. A filter material according to the preceding claims, wherein the first ply of natural fibres is provided with wet strength.
- 15 7. Use of the filter material according to the preceding claims for the production of tea bags, coffee bags or tea or coffee filters.
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